higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 3

17 November 2023

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 1.1.1 False
1.1.2 True
1.1.3 True
1.1.4 True
1.1.5 False

(5 × 1) (5)

1.2
- They have a high nutrient content.
- Their composition is more constant than that of organic fertiliser.
- They are available all year round.
- No pathogens can be found in organic fertilisers. (4)

1.3
- Ammonium nitrate
- Ammonium sulphate
- Limestone ammonium nitrate
- Potassium nitrate
- Ammonium phosphate
- Urea (Any 4 × 1) (4)

1.4
- Yara SA
- Sasol Nitro
- Omnia
- Atlas Organic Fertilisers
- Nitrophoska
- Plaaslike Boeredienste (Any 5 × 1) (5)

1.5 It is because the fertiliser is directly applied to plant leaves✓ and taken directly to the plant,✓ so the nutrient uptake occurs almost immediately.✓ (3)

1.6 Fertiliser burn can occur when an incorrect concentration of fertiliser is used. (1)

1.7
- Sulphur
- Pyrite
- Calcium sulphate (3)

1.8 1.8.1
- Digester process
- Gypsum removal process
- Evaporation process
- Purifying process (4)

1.8.2 $CaSO_4.2H_2O$✓✓ (2)

[31]

QUESTION 2

2.1 2.1.1 Calcareous✓ and argillaceous rocks✓

2.1.2 Calcareous rock contains mostly calcium carbonate,✓ whereas argillaceous rock contains clay-like material.✓

(2 × 2) (4)

2.2 $CaCO_3$ (1)

2.3
- Mining of raw materials
- Separation and mixing of raw materials
- Smelting
- Slag granule formation
- Grinding and blending of the slag (5)

2.4 Magnetite✓ (Fe_3O_4)✓
Hematite✓ (Fe_2O_3)✓
Siderite✓ ($FeCO_3$)✓ (1 mark for the name and 1 mark for the formula) (3 × 2) (6)

2.5 2.5.1 $Ca(OH)_2$ (1)

2.5.2
- Used as a flocculent in the water and waste water industry
- Used in the metal industry to remove fluorides and chlorides from exhaust gases
- Used in the food industry to preserve food and to separate sugar from cane
- Used in the petrochemical industry to produce lubricants

(Any 3 × 1) (3)

2.6 2.6.1 Na_2CO_3
2.6.2 Soda ash or washing soda
2.6.3 In the glass-making process

(3 × 1) (3)

2.7
- Used as a laxative
- Used in the pulp and paper industry to produce pulp
- Used to remove bubbles from molten glass during the glass-making process
- Used in the textile industry to treat fibre before it is dyed (Any 2 × 1) (2)

2.8 Sodium sulphate is also known as Glauber's salts. (1)

2.9
- The underground salt deposits are cut and blasted into chunks.
- The blasted rock is crushed into smaller chunks in an underground crushing area.
- The crushed chunks are crushed into smaller pieces at ground level.
- Dirt, metal and rocks are removed from these chunks, after which the chunks are crushed into even smaller pieces.
- The salt is poured in bags and sent to customers. (Any 4 × 1) (4)

[30]

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QUESTION 3

3.1 3.1.1 Alkalis are substances that have a pH that is greater than 7.

3.1.2 Hydrocarbons are organic chemical compounds made up of carbon and hydrogen.

(2 × 2) (4)

3.2
- Soap bar
- Liquid soap
- Dishwasher liquids (3)

3.3 3.3.1 NaOH
3.3.2 $C_{18}H_{34}O_2$
3.3.3 $C_{12}H_{24}O_2$

(3 × 1) (3)

3.4
- Contact killers
- Systemic killers
- Soil sterilisers (3)

3.5 3.5.1 Organic
3.5.2 Organic
3.5.3 Inorganic

(3 × 1) (3)

3.6
- SC Johnson
- Bell
- Bayer
- Monsanto
- Kombat
- Dow AgroScience
- DuPont South Africa (Any 3 × 1) (3)

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QUESTION 4

4.1
- Sappi
- Kimberly-Clark
- Mondi
- Nampak (4)

4.2 Plant fibre is the main source of virgin fibre. (1)

4.3
- Softwood
- Hardwood (2)

4.4
- The chips are cooked in a digester.
- The cooked chips are blown into a blow tank that breaks the chips into fibres.
- The pulp is washed to remove the cooking liquor from it. (3)

4.5 The purpose of supercalendering is to increase the density, smoothness and gloss of the paper. (2)

4.6
- Sandpaper
- Carbon tissue
- Photographic paper
- Wallpaper
- Conductive paper (Any 3 × 1) (3)

4.7
- Wax and hot melt lamination
- Solventless lamination
- Wet lamination
- Dry lamination
- Extrusion (Any 5 × 1) (5)

[20]

TOTAL: 100

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